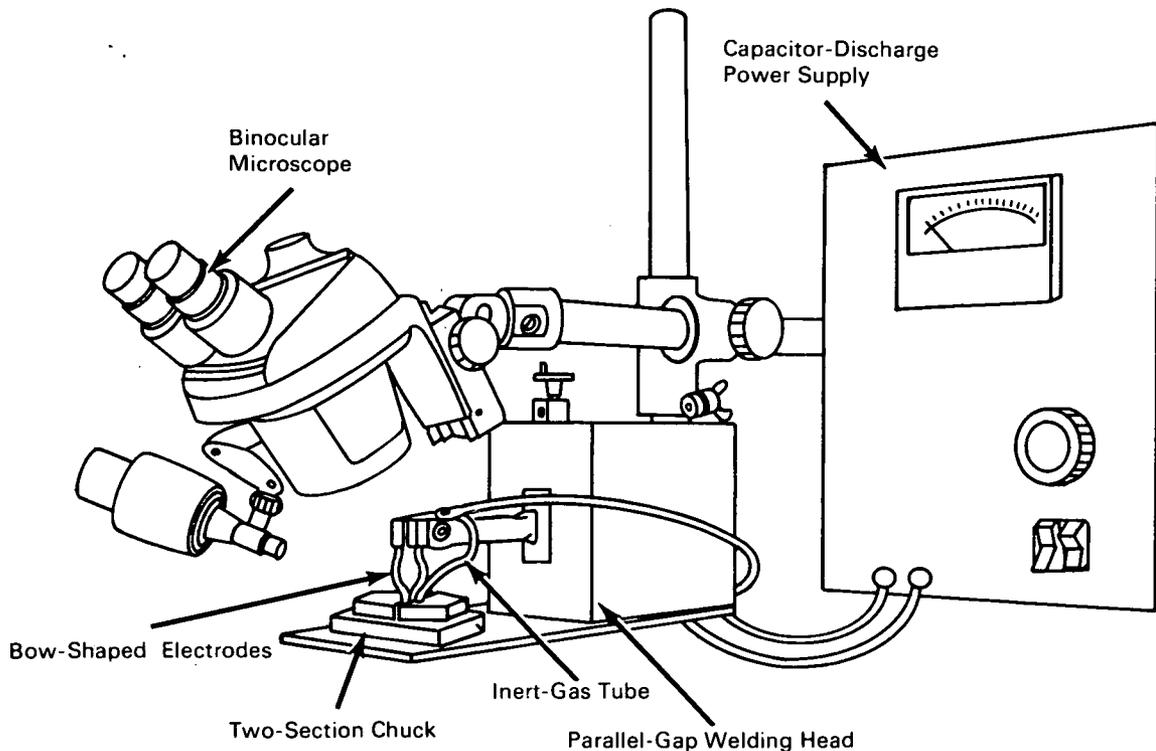


# NASA TECH BRIEF



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## Butt Welder for Fine Gage Wire



Fine-Gage-Wire Butt-Welding Setup

A device has been assembled from off-the-shelf components which will effectively weld fine gage wire as small as 0.001-in. in diameter. This device permits the welding of thermocouple junctions of the same small size as the wire with straight sections adjacent to the junctions. The electrode arrangement is designed to provide constant pressure on the joint during the welding operation while fully supporting the wires to prevent buckling or movement at the joint. It can

be used wherever smooth butt welds of fine gage wires are needed and is adaptable for production work.

This butt welder is particularly suitable for welding a type of thermocouple made of tungsten/rhenium wire that becomes hard and brittle at the weld (a property that does not permit dressing of the weld or straightening of the wire, which is required when conventional welding techniques are employed). Weld junctions no larger than the nominal size of the wire

(continued overleaf)

can now be made on tungsten/rhenium wire, with straight sections adjacent to the junction. This method is versatile because it allows the perpendicular butt welding of fine wires and also permits the welding of fine wire to the edge of metal ribbon.

The illustration shows a butt welder for fine gage wire that has been constructed partly from commercial items and partly from items made from stock materials. The welder consists of a capacitor-discharge power supply, a parallel-gap weld head with adjustable electrode gap and vertical force, bow-shaped electrodes, a copper weld base made in two sections separated by a thin insulator, an inert-gas tube, and a binocular microscope to view and position the work. The items made from stock materials were the bow-shaped electrodes, the weld base, and the inert-gas tube. The wires to be welded are first cut square, or carefully matched if slightly beveled. The wires must be clean and free of burrs.

Except for periodic dressing of the electrode and weld base, this system requires very little maintenance. This device enables an operator to repeatedly make strong, clean weld junctures with a minimum amount of training.

**Note:**

Requests for further information may be obtained from:

Technology Utilization Officer  
Langley Research Center  
Hampton, Virginia 23365  
Reference: TSP70-10136

**Patent status:**

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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